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Hiroshi Oagawa

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06/14/2006

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EXAMINER

ROY, SIKHA

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/560,819

Applicant(s)

OAGAWA, HIROSHI

Examiner

Sikha Roy

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,10,12,14 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10,12,14 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 31, 2006 has been entered.

The Examiner acknowledges receipt of Declaration under 37 CFR 1.132 of the Applicant (Hiroshi Ogawa) of May 18, 2006.

In the instant application the device claims 1,3-8,10,12,14 and 16 have been examined.

The method claims 17 and 18 have been withdrawn.

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 'thickness of at least two phosphor layers in the panel' as claimed in claims 1 and 14 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

--RADIATION IMAGE CONVERSION PANEL HAVING MULTIPLE PHOSPHOR LAYERS OF DIFFERENT THICKNESS--.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2879

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5 - 8, 10, 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 4,979,200 to Umemoto et al. U.S. Patent 5,153,078 to Kojima et al. and further in view of JP 08313699 A to Ohara et al.

Regarding claim 1 Umemoto discloses (column 1 lines 58-68, column 2 lines 1-5) a radiation image conversion panel (radiographic intensifying screen) comprising phosphor layers containing stimuable phosphors (X-ray phosphors) and binder resin where the binder resin is unevenly distributed in the phosphor layer so that the amount of the binder resin to the stimuable phosphor in the uppermost layer (in the vicinity of the protective layer) is greater than that of the binder to the phosphor in the remainder of the phosphor layers. Umemoto further discloses (column 3 lines 25-30) that in order to obtain adequate adhesive strength between the uppermost phosphor layer and the protective layer the proportion of binder resin to stimuable phosphor is preferably at least 4% by weight of the entire phosphor layers which is certainly more than 0.5 wt.% as claimed.

Umemoto discloses the phosphor having binder resin content is coated and dried but does not exemplify the radiation image panel produced by thermo-compressing two layers (sheets).

Kojima in same field of endeavor discloses (column 4 lines 6-36, column 5 lines 56-68, column 6 lines 24-30) phosphor crystals dispersed in a binder undergoing

Art Unit: 2879

compression treatment at a temperature not lower than softening or melting point, thus phosphor crystals being oriented by pressure in the treatment. Kojima further teaches this method of thermo-compressing (simultaneously compressing and fixing) the sheet provides the advantage of extending the sheet with phosphor and binder gradually on the support avoiding the destruction of phosphor particles. Furthermore the radiation image storage panel thus produced provides image of high sharpness.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to employ the thermo-compressing method of producing the dried and coated sheets of Umemoto as taught by Kojima for avoiding destruction of phosphor particles and thus resulting in high image sharpness.

Umemoto and Kojima are silent about the thickness of the uppermost layer increased relative to the thickness of the layer beneath the uppermost layer.

Ohara discloses (abstract, English translation sections [0041] – [0043]) the thickness of phosphor layers (fluorescent layer) mixed with binder changes with the property of radio-sensitization screen made for a purpose, the thickness of phosphor layer differs in every layer and the thickness of the uppermost layer is increased (becomes thin gradually towards the base material side from top protective layer side) relative to the thickness of the layer beneath. Ohara discloses this configuration yields an image of enhanced sensitivity, sharpness and graininess.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have the thickness of the uppermost phosphor layer of Umemoto and Kojima increase relative to the thickness of the layer beneath as suggested by Ohara

Art Unit: 2879

for yielding a radiation panel with an image of enhanced sensitivity, sharpness and graininess.

Referring to claim 3 Umemoto discloses the amount of the binder resin to the stimuable phosphor in uppermost layer is greater than that of the binder to stimuable phosphor in other layer by a range of from 4 to 8% by weight.

Referring to claim 5 Umemoto discloses (column 2 lines 24-50) the stimuable phosphor employable in the radiation image conversion panel includes bivalent europium activated alkaline earth complex fluoro-halide phosphor, a rare earth oxy-halide phosphor.

Regarding claim 6 Ohara discloses (English translation section [0025]) the stimuable phosphor grain size (mean particle diameter) is in the range of 1 through 20 $\mu$ m.

Regarding claim 7 and 8 Umemoto discloses (column 2 lines 60-68, column 3 lines 1,2) the thermoplastic elastomer binders can be selected from polyvinyl acetate, polyurethane, linear polyester.

Regarding claim 10 Ohara discloses (English translation section [0043]) the thickness of phosphor layer is in the range of 20  $\mu$ m to 1000 $\mu$ m.

Regarding claim 12 Ohara discloses the thickness of the phosphor layer is in the range of 50 through 300  $\mu$ m.

Regarding claim 14 Umemoto discloses all the limitations which are same as of claim 1 including the proportion of binder resin to stimuable phosphor at the uppermost layer is preferably greater by at least 4% by weight of that in other phosphor layers which is certainly more than 0.5 wt.% as claimed.

Umemoto discloses the phosphor having binder resin content is coated and dried but does not exemplify the radiation image panel produced by thermo-compressing two layers (sheets).

Kojima in same field of endeavor discloses (column 4 lines 6-36, column 5 lines 56-68, column 6 lines 24-30) phosphor crystals dispersed in a binder undergoing compression treatment at a temperature not lower than softening or melting point, thus phosphor crystals being oriented by pressure in the treatment. Kojima further teaches this method of thermo-compressing (simultaneously compressing and fixing) the sheet provides the advantage of extending the sheet with phosphor and binder gradually on the support avoiding the destruction of phosphor particles. Furthermore the radiation image storage panel thus produced provides image of high sharpness.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to employ the thermo-compressing method of producing the dried and coated sheets of Umemoto as taught by Kojima for avoiding destruction of phosphor particles and thus resulting in high image sharpness.

Umemoto and Kojima are silent about the thickness of the uppermost layer decreased relative to the thickness of the layer beneath the uppermost layer.



Ohara discloses (abstract, English translation sections [0041] – [0043]) the thickness of phosphor layers (fluorescent layer) mixed with binder changes with the property of radio-sensitization screen made for a purpose, the thickness of phosphor layer differs in every layer and the thickness of the uppermost layer is decreased (becomes thick gradually towards the base material side from top protective layer side) relative to the thickness of the layer beneath. Ohara discloses this configuration yields an image of enhanced sensitivity, sharpness and graininess.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have the thickness of the uppermost phosphor layer of Umemoto and Kojima decrease relative to the thickness of the layer beneath as suggested by Ohara for yielding a radiation panel with an image of enhanced sensitivity, sharpness and graininess.

Regarding claim 16 Ohara discloses (English translation sections [0012], [0041]) the panel comprising multilayers (3 through 10) containing stimutable phosphor and binder.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent 4,979,200 to Umemoto et al. U.S. Patent 5,153,078 to Kojima et al. and JP 08313699 A to Ohara et al. and further in view of U.S. Patent 5,519,228 to Takasu et al.

Regarding claim 4 Umemoto, Kojima and Ohara do not disclose the wavelengths in the range of 300 to 500 nm of the radiation emitted from the stimulated phosphor when irradiated with rays of wavelength in the range of 400 to 900 nm.

Takasu in analogous art of radiation image conversion panel discloses (column 4 lines 25-31) a stimuable phosphor such as divalent europium activated alkaline earth metal halide phosphor giving a stimulated emission of wavelength in the range of 300 to 500 nm when it is irradiated with stimulating rays of wavelength in the range of 400 to 900 nm is employed. It is well known in the art of radiation image panel to employ radiation of 400-900nm wavelength passing through the object and sequentially exciting the phosphor in the panel.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to specify the wavelength of 400 to 900 nm of the irradiating radiation as taught by Takasu in the radiation image conversion panel of Umemoto, Kojima and Ohara. The stimuable phosphor used in the radiation panel of Umemoto being the same stimuable phosphor (divalent europium activated alkaline earth metal halide phosphor) as disclosed by Takasu would inherently emit radiation of wavelength in the range of 300 to 500 nm when irradiated by radiation of 400-900nm wavelength.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 14 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2879

In response to applicant's presentation of unexpected results produced by thermo-compressing of at least two sheets which have been separately coated and dried in the radiation panel the Examiner respectfully submits that the radiation panel of Umemoto, Kojima and Ohara produced by the method of thermo-compressing the sheets and having the same structural limitations as of applicant's invention would deem to produce increased sharpness and illumination.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Sikha Roy*

Sikha Roy  
Patent Examiner  
Art Unit 2879